

et al., 1999). These dunes seem to move away from the crater basin into the valley (northwest to southeast), plausibly suggesting that the bright material composing these dunes originates from the crater basin; (b) Similarly bright material is observed on small depressions just south of Schiaparelli. The MGS Imaging team (MOC Release 16-A, B, C, Image No.2036, 1998) proposes that the morphology of the depressions and deposits is similar to dry lake beds with salts or other materials deposited as the lake evaporated. The hypothesis of bright salt deposits could be supported by Viking IRTM measurements (Christensen 1988) showing that a derived albedo of this bright material composing both the dunes and the deposits is 0.21, when most Martian dunes usually show lower albedo around 0.15 (Edgett and Parker 1998). Thomas et. al., (1999) also propose that the dunes are formed of relatively soft minerals, possibly sulphates which are common components of evaporites. To explain faint dark lines that cross the lighter deposits, an alternate hypothesis involving freezing and thawing of water saturated soil was proposed (MOC Release 16-A, B, C, Image No.2036, 1998, *unpublished*). These observations need to be documented as potential evidence of water ponding on Mars because if verified, this is the type of material that can help achieve some of the most important science objectives of the Surveyor Program (*e.g.* water evolution and favorable environments for life).

- **Science Interests:** Noachian, Hesperian and Amazonian Materials; Evidence for fluvial activity: convergence of fluvial valleys; plausible presence of evaporites as suggested by the presence of high albedo material in the topographic lows. Plausible morphological indicators of ancient lakes; Trafficability TBD.

3. East Terra Meridiani Basin: The same bright albedo materials are observed west of Schiaparelli and East Terra Meridiani over a surface area covering about 30,000 km². At Viking resolution, old valley networks are observed and cover the entire area. They converge towards the bright albedo material. One of the MOC image (#2306) showed a spectacular seepage valley located east to this potential site. The valley is probably similar to the valleys converging towards the basin. Therefore, there is a high probability for this area to be an ancient paleolake bed with exposed evaporites deposits.

- **Science Interests:** Noachian and Hesperian Materials. Amazonian TBD; Evidence for fluvial activity: convergence of fluvial valleys in topographic low, thus plausible presence of evaporites as suggested by the presence of high albedo material in the basin. Morphological indicators of ancient lakes; Trafficability TBD.

Engineering Constraints: The high science interest of the Schiaparelli Crater Region is combined with a favorable configuration for landing that designates this

region as a high-priority candidate area for an assessment study and further investigation by MGS. The previous topographic data from the Viking mission placed the 2000 m elevation contour along the rim (USGS I-2125, MC-20 NW, 1991), with a surrounding elevation of the Plateau at an average 3000 m. The central portion of the crater floor corresponding to an approximately 200-km diameter ring was delineated by the 1000-m contour. The recent MOLA altimeter topographic profile No. 23 allows to adjust the crater topography, and shows that the crater and the surrounding region lie significantly lower than previously thought. The floor of Schiaparelli is now located at -500+/-30m (with reference to the Mars datum) and the Plateau West of the crater and immediately South in the region of the Brazos Basin lies between 1000 and 1500 m (Smith et al., 1998).

Considering the diameter of the crater basin and the 3-sigma landing footprint ellipse required (Golombek et al., 1999), the revised data show that the elevation requirement made both by the APEX 2001 mission and the Mars Pre-Projects definition for the Mars Sample Return (Spencer et al., 1998) would be met in the Schiaparelli region, wherever a landing site being selected within the basin, and in most of the regions directly South, West and Southwest of the crater in Terra Meridiani, which are the regions of interest.

The low elevation will also benefit the mission by allowing savings in mass and propellant margin, the amount of propellant used during the terminal descent being a function of the landing site elevation -the higher the elevation, the higher the amount of propellant expended (Spencer et al., 1998). The almost equatorial position of the survey area is also a favorable parameter for landing precision. For instance, for the 01' APEX mission, at 5S, the landing footprint would be around 25 km (compared to 44 km at 15N, the best being 18 km at 15S, Golombek et al., 1998, 1999).

The existence of several sites in the same area with similarly high scientific interest provides safety back-ups in case of deviation in ellipse trajectory. In addition, the location of the region is also favorable for solar energy power and potential mission duration as shown by the plots we established for the region of rover solar array energy available (with and without dust cover) and the Lander energy profiles for the Schiaparelli region against the plots proposed by Spencer et al., (1998) for the 01' APEX mission.

Conclusion: The combination of already existing Viking, MOC, and MOLA high quality data and excellent science potential makes the Schiaparelli Crater Region one of the first regions on Mars where an *in-depth* analysis will be possible to reconstruct its hydrogeologic evolution, thus justifies the assessment of its potential as a candidate-landing area for the Surveyor Program and for future human exploration.